PATENT APPLICATION
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METHODS AND APPARATUS FOR PROVIDING PRINTER DRIVERS TO A USER

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1   **METHODS AND APPARATUS FOR PROVIDING PRINTER DRIVERS TO A USER**

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3   <u>BACKGROUND</u>

4   The use of various imaging apparatus for forming images (e.g., text and/or

5 graphics, etc.) onto sheet media, so as to produce a corresponding hardcopy or

6 document, is well known. In a typical exemplary operation, the production of such a

7 document involves the derivation of a print ready data file from an electronic document

8 file (i.e., original) by way of a printer driver. Thereafter, or contemporaneous with the

9 derivation, the print ready data file is transmitted to an imaging apparatus (e.g., a printer)

10 for imaging onto sheet media.

11   Under such an exemplary operation, a printer driver that corresponds directly to

12 the particular type (make and model) of imaging apparatus is used. Such a printer driver

13 is usually provided with the imaging apparatus at the time of original purchase on some

14 form of computer-readable media (e.g., CD-ROM, etc.), and/or is available by way of a

15 file download from an Internet-accessible website. In any case, a particular printer driver

16 associated with a given imaging apparatus is generally provided or is readily available.

17   Occasionally, a particular printer driver becomes corrupt and is no longer suitable

18 for use with the intended imaging apparatus. On other occasions, a printer driver has

19 been newly introduced to the market in association with a correspondingly new imaging

20 apparatus, but the printer driver has an unknown defect or other problem. Still other

21 situations occur wherein a particular printer driver is generally satisfactory for use,

22 except when attempting to derive a print ready data file from a specific type of electronic

23 document file. Yet another situation occurs in which a particular printer driver does not

24 perform as desired, if it all, within certain kinds of managed printing systems or

25 environments due, for example, to an incompatibility between the printer driver and the

26 printing system management application. Under these and other situations, it is

27 desirable to make use (or attempt to make use) of a printer driver other than that

28 originally intended for operation with a particular imaging apparatus – in other words, to

29 use a substitute printer driver.

30   Therefore, it is generally desirable to provide methods and apparatus directed to

31 the use of substitute printer drivers.

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33   <u>SUMMARY</u>

34   One embodiment of the present invention provides for a computer-accessible

35 storage media including a database of one or more data files, wherein each of the one or

1   more data files includes a printer type identification. Each of the one of more data files

2   also includes one or more substitute printer driver identifications associated with the

3   printer type identification, and one or more compatibility ratings associated with the

4   printer type identification and a particular one of the one or more substitute printer driver

5   identifications.

6   Another embodiment of the present inventions provides a method of managing a

7   system, the method including the steps of receiving an error message indicative of an

8   operational problem with a printer driver of the system, and accessing a computer-

9   accessible database including one or more data records. The method also includes the

10   steps of displaying a listing corresponding to the contents of the one or more data

11   records, each data record including a printer type identification, one or more substitute

12   printer driver identifications associated with the printer type identification, and one or

13   more compatibility ratings associated with the printer type identification and a particular

14   one of the substitute printer driver identifications, and issuing a selection command

15   corresponding to a particular one of the displayed substitute printer driver identifications.

16   The method further includes the step of establishing an operational association between

17   a substitute printer driver and a printer of the system in accordance with the selection

18   command.

19   These and other aspects and embodiments will now be described in detail with

20   reference to the accompanying drawings, wherein:

21

22   DESCRIPTION OF THE DRAWINGS

23   Fig. 1 is a block diagram depicting a system, in accordance with one embodiment

24   of the present invention.

25   Fig. 2 is a block diagram depicting a database listing, in accordance with another

26   embodiment of the present invention.

27   Fig. 3 is a flowchart depicting a method, in accordance with the present invention.

28   Fig. 4 is a flowchart depicting another method, in accordance with the present

29   invention.

30   Fig. 5 is a flowchart depicting still another method, in accordance with the present

31   invention.

32   Fig. 6 is a flowchart depicting yet another method, in accordance with the present

33   invention.

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35   DETAILED DESCRIPTION

1   In representative embodiments, the present teachings provide methods and
2   apparatus for defining, maintaining, accessing and using a database of information for
3   making substantially productive use of substitute printer drivers with various imaging
4   apparatus (e.g., printers).   Such a database generally includes a plurality of data
5   records, wherein each data record includes a printer type identification, one or more
6   substitute printer driver identifications associated with the printer type identification, and
7   one or more compatibility ratings associated with (i.e., correlating) the printer type
8   identification with a particular one of the substitute printer driver identifications of that
9   particular data record.

10   A database, according to the present invention, is typically provided (i.e., stored
11   and maintained) on a generally local, networked server referred to herein as a mobile
12   enterprise printing (MEP) server.   In such an embodiment as just described, the
13   database is generally referred to herein as a computer-accessible database. Also, a
14   database according to the present invention can be provided on an MEP host computer,
15   which is publicly-accessible by way of one or more Internet web pages. Thus, such an
16   embodiment of the present invention is generally referred to as a network-accessible
17   database.

18   In any case, a database in accordance with an embodiment of the present
19   invention can provide information to a systems administrator or other suitably authorized
20   user so that substitute (i.e., alternative) printer drivers can be effectively used in
21   association with particular imaging apparatus ("printers") of a data handling system.

22   Turning now to Fig. 1, a block diagram depicts a system 100, in accordance with
23   one embodiment of the present invention. The system 100 includes a user computer
24   102. The user computer 102 can be defined by any suitable computer such as, for
25   example, a desktop computer, a laptop computer, etc., configured to perform a range of
26   computing functions (e.g., program execution, data manipulation, electronic file
27   generation, etc.).   The user computer 102 further includes at least one executable
28   application (i.e., program file) 106. Furthermore, the user computer 102 is coupled in
29   data and/or signal communication with other devices of the system 100 by way of a
30   suitable network 108. One of skill in the computing arts can appreciate that the user
31   computer 102, as well as the network 108, are generally well known and that further
32   elaboration thereof is not required for purposes of understanding the present invention.

33   The system 100 also includes an e-mail server 104 coupled in data and/or signal
34   communication with the network 108. The e-mail server 104 is configured to perform a
35   number of typical e-mail receiving, storing and routing operations and can be generally

1   defined by any such server suitable for such purposes. As depicted in Fig. 1, the e-mail

2   server 104 stores one or more electronic messages 138 and/or electronic document

3   attachments respectively awaiting download by their intended recipients.

4   The system 100 also includes a first type printer 110, a second type printer 112,

5   and a third type printer 114, each respectively coupled in data and/or signal

6   communication with the network 108. The first, second and third type printers 110, 112

7   and 114 are defined by respectively different types (make and/or model) of imaging

8   apparatus, and each is generally configured to form images on sheet media in

9   accordance with a print-ready data file (not shown) received by way of the network 108.

10   Further elaboration of the first, second, and third type printers 110, 112 and 114 is

11   provided hereinafter.

12   The system 100 also includes wireless bridge 116. The wireless bridge is

13   configured to couple one or more kinds of mobile devices 118 in bidirectional data and/or

14   signal communication with the network 108 by way of wireless signals 120. In this way,

15   the wireless bridge 116 can be generally defined as transceiver type of device.

16   Furthermore, the wireless bridge 116 can be configured so that the wireless signals 120

17   are defined by any suitable such signals such as, for example, infrared signals, radio

18   frequency (RF) signals, Bluetooth ® signals, etc. Bluetooth is a registered mark owned

19   by Bluetooth Sig, Inc., Washington, D.C. 20005. In any case, the wireless transceiver is

20   configured to facilitate the bidirectional exchange of information, data and/or control

21   signals between various system 100 devices (e.g., the user computer 102, the first type

22   printer 110, etc.) and one or more kinds of mobile devices 118 by way of the wireless

23   signals 120.

24   The system 100 also includes a mobile device 118 as introduced above. As

25   depicted in Fig. 1, the mobile device 118 is generally defined by a handheld computer.

26   One example of such a handheld computer is the HP iPAQ Pocket PC h4350 available

27   from Hewlett-Packard Company, Palo Alto, California 94304. Other types of mobile

28   devices (not shown) can also be used such as, for example, laptop computers, personal

29   digital assistants (PDA's), network-capable cellular telephones, etc. The mobile device

30   118 is typically configured to perform any number of computing and/or data manipulation

31   tasks, and to wirelessly communicate data and/or signals between itself and one or more

32   of the system 100 devices by way of the wireless signals 120, the wireless bridge 116

33   and the network 108. Further elaboration of the mobile device 118 is provided

34   hereinafter in regard to a typical operation of the system 100.

1   The system 100 also includes a mobile enterprise printing (MEP) server 122, in

2   accordance with the present invention. The MEP server (i.e., server) 122 is coupled in

3   data and signal communication with the other system 100 devices by way of the network

4   108.   The MEP server 122 is configured to perform any number of typical server

5   functions such as, for example, data file storage, transfer of electronic messages and

6   electronic documents between other devices of the system 100, execution of network

7   applications (programs), etc. The MEP server 122 is also configured to perform a

8   number of operations particular to the present invention and as elaborated in further

9   detail hereinafter. The MEP server 122 includes one or more printer drivers 124, a

10   mobile enterprise printing driver database (hereinafter, computer-accessible database)

11   126, and one or more application program files 128.

12   As depicted in Fig. 1, the system 100 further includes a connection to the Internet

13   130 by way of the network 108. The system 100 also includes a mobile enterprise

14   printing host server (MEP host) 132, which is accessible by the MEP server 122 and/or

15   other devices of the system 100 by way of the network 108 and the Internet 130. Thus,

16   the MEP host 132 generally defines an Internet-accessible device. The MEP host 132

17   includes one or more Internet-accessible web pages 134 and a mobile enterprise printer

18   driver database (hereinafter, network-accessible database) 136. Further details of the

19   MEP host 132 are provided hereinafter in regard to the typical operation of the system

20   100.

21   The system 100, as depicted in Fig. 1, is a non-limiting exemplary embodiment of

22   the present invention. As such, other system embodiments (not shown) in accordance

23   with the present invention can also be defined and used, which are more or less

24   complex (i.e., inclusive of greater or fewer networked devices) than the system 100 of

25   Fig. 1. Therefore, it is to be understood that the system 100 of Fig. 1 is intended to

26   depict one of an unlimited number of possible embodiments of the present invention.

27   Fig. 2 is a block diagram depicting a database listing 200, in accordance with the

28   system 100 of Fig. 1. In particular, the database listing 200 substantially corresponds to

29   (depicts) the data-type contents and structure of the computer-accessible database 126

30   of the MEP server 122, and/or the network-accessible database 136 of the MEP host

31   132 of Fig. 1.

32   The database listing 200 includes a number of data records 202 generally

33   arranged as rows and columns of associated data, such that a matrix is generally

34   defined. Each data record 202 includes a printer type identification 204. Each printer

35   type identification 204 typically includes make and model information for a particular kind

1   of imaging apparatus. Other suitable kinds of printer identification information can also

2   be used. Each data record 202 also includes one or more substitute printer driver

3   identifications 206. Each substitute printer driver identification (SPDI) 206 is associated

4   with the printer type identification 204 of that particular data record 202, and provides

5   sufficient information to identify a printer driver (electronic application file) used to derive

6   a print-ready data file for transmission to a specific type of imaging apparatus.

7   To clarify, a particular data record 202 is designated in Fig. 2 as exemplary data

8   record 220. The exemplary data record 220 includes a printer type identification 204

9   depicted as a "TYPE 1" imaging apparatus, and further includes three substitute printer

10   driver identifications 206 respectively depicted as "TYPE 2", "TYPE 4" and "TYPE 7".

11   Each of the SPDI's 206 of the exemplary data record 220 is thus associated with the

12   "TYPE 1" printer type identification 204. It is important to note that each particular printer

13   type identification 204 (e.g., "TYPE 1") is generally present within only one data record

14   202 of the database listing 200, but respective SPDI's 206 can be present within any

15   number of different respective data records 202.

16   Each of the substitute printer driver identifications 206 within a particular data

17   record 202 is further associated with a pair of compatibility ratings 208. As depicted in

18   Fig. 2, each data record 202 includes both a star-type compatibility rating 210 and a

19   percentage-type compatibility rating 212. Each compatibility rating 210 and 212 is

20   intended to indicate some measure of suitability or overall qualitative performance when

21   using the associated substitute printer driver (as identified by the corresponding SPDI

22   206) to derive a print-ready data file for the corresponding imaging apparatus (as

23   identified by the printer type identification 204). Thus, each of the compatibility ratings

24   210 and 212 associates (or correlates) the printer type identification 204 within a given

25   data record 202 with a particular substitute printer driver identification 206 within that

26   same data record 202.

27   In continuation of the clarifying example introduced above, the exemplary data

28   record 220 includes a star-type compatibly rating 210 of "FOUR STARS" (depicted

29   graphically in Fig. 2) and a percentage-type compatibility rating 212 of "91%" to describe

30   the overall performance of using a "TYPE 2" printer driver to derive a print-ready data file

31   for a "TYPE 1" imaging apparatus. This is compared with a "TWO STARS" compatibly

32   rating 210 and a "66%" compatibility rating 212 to describe using a "TYPE 4" printer

33   driver in cooperation with the "TYPE 1" imaging apparatus of the exemplary data record

34   220. In this exemplary comparison, the compatibility ratings 210 and 212 indicate that a

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1 "TYPE 2" printer driver is generally desirable over a "TYPE 4" printer driver when used in
2 cooperation with a "TYPE 1" imaging apparatus.

3 Thus, the database listing 200 provides information to a user, such as an
4 information systems manager or other appropriate personnel, enabling them to make
5 informed selections when seeking to use a substitute printer driver in cooperation with a
6 particular imaging apparatus (printer). It is to be understood that in another embodiment
7 (not shown) of the database listing 200, only one of the star-type compatibility ratings
8 210 or the percentage-type compatibility ratings 212 is present. Furthermore, it is to be
9 understood that other types of compatibility ratings not specifically depicted herein can
10 also be used in accordance with the present invention.

11 A number of typical, non-limiting exemplary operations are now described
12 hereafter in order to convey a fuller appreciation and understanding of the systems and
13 methods of the present invention.

14 Fig. 3 is a flowchart 300 depicting a method, in accordance with the present
15 invention. For purposes of understanding, the method of the flowchart 300 is described
16 within the context of the system 100 of Fig. 1 and the database listing of Fig. 2.
17 However, the method of the flowchart 300 is generally usable in accordance with any
18 number of other embodiments of the present invention.

19 In step 302 (Fig. 3), a user produces an electronic message (i.e., e-mail) on the
20 user computer 102 (Fig. 1) using a suitable application 106. The electronic message,
21 along with an attached electronic document (e.g., spreadsheet, word processing
22 document, graphic illustration, etc.), is then transmitted to a particular recipient and is
23 stored as a waiting electronic message 138 on the e-mail server 104. In another
24 embodiment (not shown) of the system 100, the MEP server 122 is further configured to
25 function as an e-mail server, and the discrete e-mail server 104 is not included.

26 In step 304 (Fig. 3), the recipient (user) of the e-mail transmitted in step 302
27 above downloads the electronic message 138 (Fig. 1), without the electronic document
28 attachment, from the e-mail server 104 into the mobile device 118 by way of the wireless
29 bridge 116 and wireless signals 120. The user of the mobile device notes that an
30 electronic document was attached to (i.e., associated with) the original e-mail
31 transmission and that such electronic document awaits download or other operations.

32 In step 306 (Fig. 3), the recipient user of the mobile device 118 (Fig. 1) sends a
33 request (i.e., issues a command) to the MEP server 122 calling for the electronic
34 document attachment to be printed. The issued print command includes a reference to
35 the particular electronic message, one or more credentials or security identifications, and

1   an identification of the particular imaging apparatus to be used. In this example, it is
2   assumed the first type printer 110 is the identified printer, either by direct user selection,
3   as a default setting in the mobile device 118, or in accordance with the electronic
4   document attachment content.

5   In step 308 (Fig. 3), the MEP server 122 (Fig. 1) receives the print command
6   issued by the mobile device 118 by way of the network 108, and thereafter verifies the
7   associated credentials information. The MEP server 122 then downloads the electronic
8   document attachment from the e-mail server 104 using the electronic message
9   reference and the associated credentials provided with the print command issued in step
10   306 (Fig. 3) above. The print command reception, credentials verification, and electronic
11   document download operations just described are typically performed in accordance
12   with a corresponding mobile enterprise printing application 128 that is executed by the
13   MEP server 122.

14   In step 310 (Fig. 3), the MEP server 122 (Fig. 1) uses a pre-designated (i.e.,
15   pre-selected) substitute printer driver 124 to derive a print-ready data file from the
16   electronic document. It is assumed for purposes of example that the particular substitute
17   printer driver 124 has been pre-designated for use in association with the first type
18   printer 110 by an appropriate administrative user such as an information systems
19   manager or other authorized person.

20   In step 312 (Fig. 3), the MEP server 122 (Fig. 1) then sends the print-ready data
21   file derived in step 310 (Fig. 3) above to the first type printer 110 (Fig. 1) by way of the
22   network 108. The first type printer 110 receives the print-ready data file from the MEP
23   server 122 and images one or more sheets of media (e.g., paper, etc.) in accordance
24   therewith, thus producing an imaged document corresponding to the original electronic
25   document attachment. The method of flowchart 300 is now considered complete for one
26   operational example.

27   The method of the flowchart 300 provides one operational example of the system
28   100 of Fig. 1 under typical "up and running" conditions. That is, the method of the
29   flowchart 300 is generally performed after (or between) any administrative adjustments
30   to the system 100, such as the designation of the particular substitute printer driver 124
31   that is operationally associated (used in conjunction) with the first type printer 110.
32   Other methods of the present invention, which are respectively associated with generally
33   administrative operations of the system 100 of Fig. 1, are described in detail hereinafter.

34   Furthermore, it is to be understood that the electronic message, as described in
35   step 302 (of Fig. 3) above, can include more than one attached electronic document

1   when transmitted to its intended recipient. In such a case, the recipient user would

2   typically provide appropriate selection information within the print command issued in

3   step 306 above, corresponding to those electronic document attachments that are to be

4   printed. Of course, each of the selected electronic documents is then downloaded in

5   step 308, respective print-ready data files for each of the selected electronic document

6   are derived in step 310, and the respective print-ready data files are routed to the first

7   type printer 110 (or whichever imaging apparatus was identified in the issued print

8   command of step 306) in step 312.

9   In yet another method of the present invention (not shown), a recipient user can

10   receive an electronic message with no attachments at all, in which case the recipient

11   user can elect to substantially perform all of the steps 304-312, as described above, in

12   regard to printing just the text (content) of the electronic message itself. Other method

13   variations can also be used within the context of the present invention.

14   Fig. 4 is a flowchart 400 depicting another method, in accordance with the

15   present invention. While the method of the flowchart 400 is described within the context

16   of the system 100 of Fig. 1 and the database listing 200 of Fig. 2, it is to be understood

17   that the method of the flowchart 400 can be applied to any number of other suitable

18   embodiments of the present invention.

19   In step 402 (Fig. 4), an administrative user or other typically authorized person

20   receives an error message from the MEP server 122 (Fig. 1) by way of the user

21   computer 102 indicative of a problem with the particular printer driver 124 that is

22   presently designated for use with the first type printer 110.

23   In step 404 (Fig. 4), the administrative user initiates (runs) an application program

24   128 (Fig. 1) generally referred to as an MEP administration tool at the MEP server 122.

25   In another embodiment, the MEP administration tool can be provided as an application

26   106 within the user computer 102. In any case, the MEP administration tool (i.e., an

27   application program) 128 is initiated by way of the user computer 102.

28   In step 406 (Fig. 4), the MEP administrative tool 128 (Fig. 1) accesses the

29   computer-accessible database 126 of the MEP server 122 and reads the one or more

30   data records 202 (Fig. 2) contained therein. In turn, the MEP administrative tool 128

31   (Fig. 1) causes a corresponding database listing 200 (Fig. 2) to be displayed by way of a

32   monitor of the user computer 102 (Fig. 1).

33   In step 408 (Fig. 4), the administrative user selects from the substitute printer

34   driver identifications 206 (Fig. 2), using the star-type compatibility ratings 210 and/or

35   percentage-type compatibility ratings 212 as a guide, in order to choose a substitute

1   printer driver 124 (Fig. 1) to be associated with the first type printer 110. For purposes of

2   example, it is assumed that the administrative user chooses the "TYPE 2" (Fig. 2)

3   substitute printer driver and issues a selection command to that affect to the MEP server

4   122 (Fig. 1) by way of the user computer 102. The MEP server 122 responds to the

5   selection command by implementing an operational association between a "TYPE 2"

6   printer driver 124 and the first type printer 110. Thus, any subsequent requests to print

7   using the first type printer 110 will result in the use of the "TYPE 2" printer driver 124 by

8   the MEP server 122 to derive the corresponding print-ready data file. A single operation

9   of the method of the flowchart 400 is now considered complete.

10   The method of the flowchart 400 is therefore generally directed to the

11   administrative task of establishing (implementing) a substitute printer driver for use with

12   a particular imaging apparatus of the system 100 of Fig. 1. As described above, such an

13   implementation is typically performed in response to an error message or other

14   indication that the presently associated printer driver (e.g., a "TYPE 1" printer driver, not

15   shown) is dysfunctional or otherwise unsuitable. Other criteria can also be used to

16   prompt such a substitution, such as, for example, an administrative user's experience

17   that a particular substitute printer driver 124 results in a more satisfactory imaged

18   document when a particular electronic document (source) and imaging apparatus

19   (printer) combination have been selected.

20   Fig. 5 is a flowchart 500 depicting still another method, in accordance with the

21   present invention. For purposes of understanding, the method of flowchart 500 is

22   described within the context of the system 100 of Fig. 1 and the database listing 200 of

23   Fig. 2. However, it is to be understood that the method of the flowchart 500 can be

24   generally applied to any number of other suitable embodiments of the present invention.

25   In step 502 (Fig. 5), an administrative user browses one or more web pages 134

26   (Fig. 1) of the MEP host 132 by way of the user computer 102, the network 108 and the

27   Internet 130. The web pages 134 provide viewable access to data records of the

28   network-accessible database 136 of the MEP host 132, resulting in a database listing

29   substantially analogous (structurally similar) to the database listing 200 of Fig. 2. Thus,

30   the administrative user at the user computer 102 is able to browse an Internet-

31   accessible (i.e., publicly accessible) listing of various printer type identifications (see the

32   printer driver identifications 204 of Fig. 2), substitute printer driver identifications (see the

33   SPDI's 206 of Fig. 2), and their corresponding compatibility ratings (see the compatibly

34   ratings 210 and 212 of Fig. 2).

1   In step 504 (Fig. 5), the administrative user determines that a particular
2   printer-type and substitute-printer-driver combination that is known to be suitable to the
3   administrative user is not included within the data records of the network-accessible
4   database 136 (Fig. 1) of the MEP host 132.

5   In step 506 (Fig. 5), the administrative user enters the known (new) printer type
6   identification, substitute printer driver identification, and at least one compatibility rating
7   (i.e., star-type, percentage-type, etc.) into a data input (feedback) form provided by the
8   web pages 134 (Fig. 1) of the MEP host 132. The administrative user then issues a
9   command committing the entered information to the MEP host 132.

10   In step 508 (Fig. 5), the MEP host 132 (Fig. 1) then adds the new user-entered
11   information from step 506 above to the network-accessible database 136. In this way,
12   the new information is made available to other users who access the network-accessible
13   database 136 of the MEP host 132. A single operation of the method of the flowchart
14   500 is now complete.

15   The method of the flowchart 500 generally describes one way in which a
16   collective database, or clearinghouse, of printer identifications, substitute printer drivers
17   and compatibility ratings data can be provided in a publicly accessible and updateable
18   forum. Other suitable methods that are similar to the method of the flowchart 500 can
19   also be used, which respectively include other method steps and/or orders of execution.

20   For example, in another method (not shown), an administrative user can discover
21   that a certain printer type and substitute printer driver combination is already present
22   within the network-accessible database 136, but the administrative user does not agree
23   with the corresponding compatibility rating as provided.   In such a case, the
24   administrative user can provide input via a data input form of the web pages 134 that
25   changes, or affects a weighted averaging, of the particular compatibility rating.   In
26   another, similar method (not shown), the administrative user can provide brief textual
27   comments that are viewable by way of the web pages 134, so as to give generally
28   concise information relating to specific advantages and/or problems with the cited printer
29   type and substitute printer driver combination. Other methods can also be used.

30   Fig. 6 is a flowchart 600 depicting yet another method, in accordance with the
31   present invention. The method of the flowchart 600 is described within the context of the
32   system 100 of Fig. 1 and the database listing 200 of Fig. 2, for clarity of understanding.
33   However, it is to be understood that the method of the flowchart 600 is generally
34   applicable to any number of other suitable embodiments of the present invention.

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1   In step 602 (Fig. 6), an administrative user inputs (issues) an update listing (i.e.,

2   update) command to the MEP server 122 (Fig. 1) by way of the user computer 102 and

3   the network 108. In response to the issued update command, the MEP server 122, in

4   accordance with a corresponding mobile enterprise printing (i.e., update) application

5   128, establishes a communications link (accesses) with the network-accessible

6   database 136 of the MEP host 132 by way of the Internet 130.

7   In step 604 (Fig. 6), the MEP server 122 (Fig. 1) downloads the current contents

8   (data records) from the network-accessible database 136 into the MEP server 122. For

9   purposes of this example, it is assumed that the data records (e.g., see the data records

10   202 of Fig. 2) of the network-accessible database 136 are downloaded in their entirety in

11   anticipation of a full computer-accessible database 126 replacement. In another

12   method, the MEP server 122 selectively downloads only certain ones of the data records

13   (or portions thereof), in accordance with a comparison between the data record content

14   of the computer-accessible database 126 and the network-accessible database 136. In

15   such a later method, only those data records of the network-accessible database 136

16   which are new and/or different relative to the data records of the computer-accessible

17   database 126 are downloaded.

18   In step 606 (Fig. 6), the MEP server 122 (Fig. 1) amends the computer-

19   accessible database 126 using the data records downloaded in step 604 above. For

20   purposes of this example, it is assumed that the entirety of the computer-accessible

21   database 126 is replaced with the downloaded data record content. In the case of the

22   later method introduced above in step 604, the data records of the computer-accessible

23   database 126 are added to and/or certain of them are altered so as to bring the

24   computer-accessible database 126 into to complete or substantially complete

25   correspondence with the network-accessible database 136. A single operation of the

26   method according to the flowchart 600 is now complete.

27   In using the method of the flowchart 600, the computer-accessible database 126

28   is substantially updated with the latest available printer driver identification, substitute

29   printer driver identification and compatibility ratings information. While the method of

30   Fig. 6 describes an update procedure that is substantially manually initiated, one of skill

31   in the art can appreciate that the same or similar such methods can be generally

32   automated and performed, for example, at fixed intervals of time, after a pre-selected

33   number of print operations are performed, etc.

34   It will also be appreciated that the flowcharts 300, 400, 500 and 600 of respective

35   Figs. 3, 4, 5 and 6, described above, are exemplary only, and that different, additional,

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1   and/or fewer steps can be used, and the steps performed in different sequence than
2   presented, all in accordance with embodiments of the present invention.
3   While the above methods and apparatus have been described in language more
4   or less specific as to structural and methodical features, it is to be understood, however,
5   that they are not limited to the specific features shown and described, since the means
6   herein disclosed comprise preferred forms of putting the invention into effect.   The
7   methods and apparatus are, therefore, claimed in any of their forms or modifications
8   within the proper scope of the appended claims appropriately interpreted in accordance
9   with the doctrine of equivalents.

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